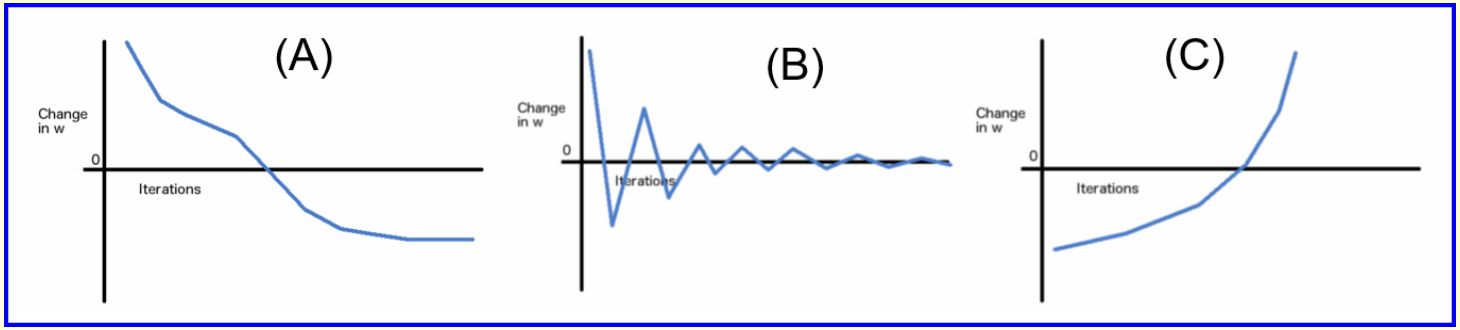
Homework assignments for Class #3

1. Suppose *w* is the weight on some connection in a neural network. The network is trained using gradient descent until the learning converges. We plot the change of *w* as training progresses. Which of the following scenarios shows that convergence has occurred? Notice that plotted is the change in *w*, as opposed to *w* itself.



2. The first Dense layer of the Tybalt's VAE model takes as input a tensor of 5,000 gene expression levels and transforms it into a tensor of 100 hidden variables. How many artificial neurons constitute this layer? How many parameters are used by these neurons?

3. The basic autoencoder models are implemented using different Keras approaches discussed in class #2: the Functional API approach (Model 1) and the Sequential construct approach (Model 2). Reimplement Model 2 using the functional API approach. To this end, copy the script basic_ae_model2.py to your current folder and modify it using the script basic_ae_model1.py as an example and the slides #6 and #7 from class # 2 as a reference. Add a call to the summary method. Make sure the reimplemented code runs on Biowulf and produces the output similar to that of the original implementation. How many parameters are used by Model 2?